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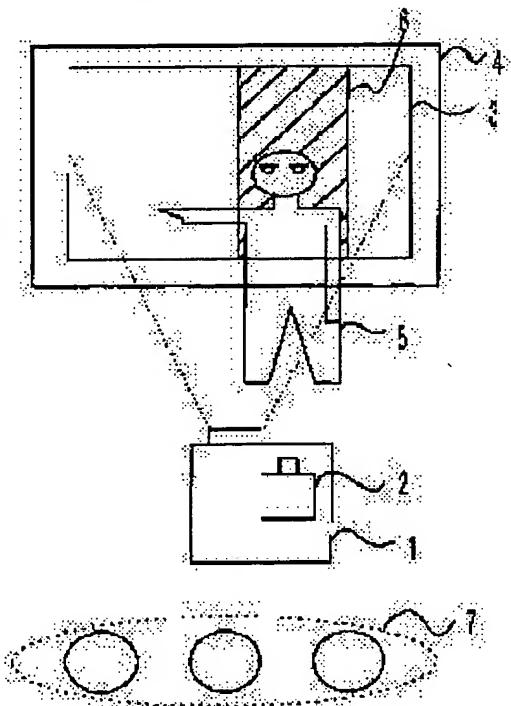
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(54) PROJECTION TYPE DISPLAY DEVICE AND INFORMATION STORAGE MEDIA

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a projection type display device having an antidazzle function to decrease an incident amount of an image light to eyes of a person positioning in the display area by controlling brightness of the image light at an area where the person is located in the display area.

SOLUTION: An image light is projected in a display area 3 on a screen 4 from a projector 1, a projection type display device, arranged in the front. A person 5 being a presenter exists in this display area 3 to indicate the predetermined position and executes the presentation looking the audience 7. The projector 1 is provided with a CCD camera being an image pick-up means 2 and a position of the person on a display position is detected. According to the detected result of the position of the person, an image light of the image brightness adjusting area 6 is set to a black level. Consequently, an incident amount to eyes of the person 5 of image light projected from the projector 1 is reduced and the person 5 does not feel dazzle by the image light.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a projection mold display and information storage media, such as a liquid crystal projector.

[0002]

[Background Art and Problem(s) to be Solved by the Invention] In recent years, the presentation in the gestalt which carries out amplification projection of the electronic image information is widely performed by the spread of a perso computer and projection mold displays, such as a liquid crystal projector.

[0003] In a presentation, it can point to the main point of the content of a display, and a more effective and efficient presentation is realized because a presenter does the direct location directions of a part of display field. Therefore, occasionally a presenter is located in a display field, and there is a case where a presentation is performed, looking at audience. When the projection mold display is being used at this time, it sees from a presenter's location, and since a projection mold display and spectators are the same directions, the image light which a projection mold display outp carries out direct incidence of them to a presenter's eyes.

[0004] The projection quantity of light of appearance and a projection mold display from which the brightness of sufficient projection image is obtained also in a bright environment is improving every year. Therefore, when the im light of a projection mold display carries out direct incidence to a presenter's eyes, a presenter has the problem of feeling dazzle and displeasure.

[0005] Moreover, at this time, the expression of a face may change because a presenter narrows an eye for dazzle, an it may have an adverse effect on the impression to an audience's presenter.

[0006] This invention is accomplished in view of such a technical problem, and the object is in offering the informat storage medium of the system which has the projection mold indicating equipment which has the presenter anti-dazz cure function which controls the brightness of the image light of the field in which a person is located in the display field of a projection mold indicating equipment, and a projection mold indicating equipment.

[0007]

[Means for Solving the Problem] An image light projection means by which the 1st invention projects image light on display field in order to attain said object, A person location detection means to detect the positional information of t person located in said display field from the image pick-up information acquired by image pick-up means to picturiz said display field, and said image pick-up means, It is the projection mold display characterized by having an adjustment means whenever [image luminosity / which adjusts the brightness of a brightness coordination area decision means to determine the brightness coordination area of said image light from said person's positional information, and said image light of said brightness coordination area].

[0008] For this reason, the anti-dazzle cure for the person of a display field; i.e., a presenter, is attained by controllin image light from the positional information of the person located in a display field.

[0009] It is the projection mold display with which 2nd invention is characterized by said brightness coordination are decision means making the field which overlaps the person location which said person location detection means dete the brightness adjustable range of said image light in the 1st invention.

[0010] For this reason, intensity control of the image light of the location a person's eyes can be certainly performed performing intensity control of the image light of the field which overlaps a person location. Moreover, compared w the case where only the location of a person's eyes is detected, a field is large, the person's itself location can be detected certainly easily and an effective anti-dazzle cure is possible for it. In addition, for the spectators who look a image, it is the field an image is not in sight by existence of a person, and, as for the image light projected on a perso

location, performing intensity control of the image light of the whole person location does not have big effect on a display function.

[0011] It is the projection mold display with which 3rd invention is characterized by said image pick-up means making said display field and its boundary region the image pick-up range in the 1st invention.

[0012] For this reason, person location detection is attained also around a display field. Although it is necessary to perform separation of a display image and a person image in order to perform person detection in a display field, the circumference of a display field does not have the need and detection of a person image is attained easily.

[0013] The 4th invention detects the horizontal range of the person location in a display field in the 3rd invention based on the image pick-up information on the display field lower part that said image pick-up means picturized said person location detection means, and said brightness adjustable-range decision means is the projection mold display characterized by to make said display field of the horizontal range of said person location into a brightness adjustable range.

[0014] For this reason, a person image is easily detectable from the image pick-up information on a limited field which is called the display field lower part. In the display field lower part, since the person whose reason in which location detection is possible is a presenter is usually a straight position, when an eye, i.e., a face, exists in a display field, a fuselage or the leg exists in the display field lower part. It is because the horizontal location of a person's display field is detectable by detecting it. By performing intensity control of image light to the whole horizontal location which the display field detected, when the presenter is standing straight, the intensity control also of the image light of the location of an eye can be carried out.

[0015] It is the projection mold display with which 5th invention is characterized by an adjustment means making black level the brightness of said image light of said brightness coordination area whenever [said image luminosity the 1st invention.

[0016] For this reason, the image light which carries out direct incidence to a presenter's eyes can be reduced substantially. In addition, for the spectators who look at an image, even if the image light projected on a person located in a field an image is not in sight and makes image light of the whole person location black by existence of a person, does not have big effect on a display function.

[0017] Person location detection control information for the 6th invention to detect the positional information of the person located in said display field based on the image pick-up information on the display field of a projection mold indicating equipment, The brightness coordination area decision control information for determining the brightness coordination area of the image light which said projection mold display projects from said person's positional information, It is the information storage medium which memorized adjustment control information whenever [for adjusting the brightness of said image light of said brightness coordination area / image luminosity] and in which computer read is possible.

[0018] The 7th invention is an information storage medium characterized by including the control information which makes the field which overlaps a person's location where said brightness coordination area decision control information is located in said display field in the 6th invention the brightness control range of said image light.

[0019] The 8th invention detects the horizontal range of a person location [in / based on the image information of the display field lower part of a projection mold indicating equipment / in said person location detection control information / a display field] in the 6th invention, and said brightness adjustable-range decision control information an information-storage medium characterized by to include the control information which makes said display field of the horizontal range of said person location a brightness adjustable range.

[0020] The 9th invention is an information storage medium characterized by adjustment control information including the control information which makes black level the brightness of said image light of said brightness coordination area whenever [said image luminosity] in the 6th invention.

[0021]

[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained based on a drawing.

[0022] (1) The whole explanatory view 1 is approximate account drawing of the activity gestalt of the projection mold display with which this invention was applied.

[0023] On the screen 4, image light is projected on the display field 3 from the projector 1 which is the projection mold indicating equipment prepared in the transverse plane. In drawing 1, the person 5 who is a presenter points out a position, and signs that the presentation is performed are drawn, existing in this display field 3 and looking at spectators 7 to a ***** sake. In a projector 1, CCD camera 2 which is an image pick-up means is formed, and the person location on a display field is detected to it. And according to the detection result of a person location, image light of coordination area 6 is made into black level whenever [image luminosity]. Therefore, the amount of incidence to a

person's 5 eye of the image light projected from a projector 1 is reduced, and a person 5 does not sense the dazzle by image light.

[0024] Although the display information which should be displayed essentially is no longer displayed on a coordinate area 6 whenever [image luminosity] here Since the person 5 has prevented light from image reflecting on a screen 4 and he cannot acquire an image normal in the part in which a person 5 is located, even if he does not adjust the brightness of image light, When a coordination area 6 is [whenever / image luminosity] mostly in agreement with a person's 5 location, there is little lowering of the display information by adjustment 6 whenever [image luminosity]

[0025] Drawing 2 shows the functional block diagram of the projection mold indicating-equipment system of this example.

[0026] The projection mold display 11 has the image pick-up means 14 and the processing section 12 other than the image light projection means 13.

[0027] The image pick-up means 14 is a means to change light into an electrical signal, and a CCD camera is used for it. The image pick-up field is a field including the display field of the image light projection means 13.

[0028] The processing section 12 is the part which performs intensity control of image light, and changes from a controller 17 to a functional order whenever [person location detecting-element 15, brightness coordination area decision section 16, and image luminosity]. The person location detecting element 15 performs processing which detects the location of the person on a display field from the image pick-up information acquired with the image pick up means 14. The brightness coordination area decision section 16 performs processing which adjusts the brightness which field of a display field low, or determines the field based on the positional information of the person who is asked by the person location detecting element 15. Whenever [image luminosity], by the controller 17, to the image input which shows an original display image, the brightness of the brightness coordination area for which it asked in the brightness coordination area decision section 16 is made into black level etc., and processing which reduces brightness is performed.

[0029] In addition, with the image light projection means 13, it not necessarily unites with the interior of the projection mold display 11, and the image pick-up means 14 and the processing section 12 do not need to exist. For example, the processing section 12 may exist outside. Moreover, whenever [functional / of a part of processing section 12 /, for example, image luminosity,], only a controller 17 may exist in the projection mold display 11, and except [its] may exist outside. Moreover, the processing section 12 can realize a function also on the hardware of dedication, or a computer.

[0030] (2) Explain one example of anti-glare treatment which is a series of processings in which whenever [image luminosity / of the person location on the explanation display field of the content of anti-glare treatment] is reduced. This anti-glare treatment is performed in the processing section 12.

[0031] Drawing 3 is a flow chart which shows the whole anti-glare treatment of this example, and drawing 4 is a timing chart which shows actuation of the anti-glare treatment of this example. It explains using drawing 3 and drawing 4.

[0032] First, the image pick-up information on the display field circumference lower field 20 is extracted from the image pick-up information acquired with an image pick-up means at step S01. That is, only the information on the field which carries out person location detection is extracted out of the image pick-up information on all the image pick-up fields 22. Although the object which detects the horizontal location of a person location from the image pick-up information on the display field circumference lower field 20 needs to perform separation of a display image and a person image when performing person detection in a display field, the need does not exist around a display field and it is because detection of a person image is easily possible. Moreover, since the person whose reason it is possible to detect the horizontal location of a person location from the image pick-up information on the display field circumference lower field 20 is a presenter is standing straight, when an eye, i.e., a face, exists in a display field, a fuselage or the leg exists in the display field circumference lower part. Therefore, it is because the horizontal location of a person's display field is detectable by detecting it. In addition, by performing intensity control of image light to the whole horizontal location which the display field detected, when detecting only a person's horizontal location, when a presenter is standing straight, intensity control is possible also for the image light of the location of an eye, and a presenter's anti-dazzle flume ***** can be attained.

[0033] The image pick-up signal 31 shows a part for 1 level line of the image pick-up information on the display field circumference lower field 20 of drawing 4 obtained by processing of step S01. The intensity level of the image pick-up signal 31 of the part in which a person 5 exists is lower than the part in which a person 5 does not exist. When the display boundary region of this is a screen, since a person 5 does not reflect light rather than a screen, he is because it becomes dark.

[0034] Next, at step S02, image pick-up information acquired at step S01 is made binary, and person positional

information is generated. That is, the image pick-up signal 31 is made binary by the binary-ized threshold level 32, a the person position signal 33 which shows a person's horizontal location is acquired.

[0035] In addition, it corresponds to the processing which performs processing of steps S01 and S02 by the person location detecting element 15 of drawing 2.

[0036] Next, the brightness coordination area information on image light is generated from person location detection information at step S03. Specifically, the brightness coordination area signal 34 which was acquired at step S02 and which extended pulse width, i.e., positional information, to the person position signal 33 which shows a person's horizontal positional information is generated. The reason for making a brightness coordination area larger than a person location field from the first is for giving the appearance and allowances which can perform image light control of the field a person's face also in the case where the person is not standing straight thoroughly.

[0037] In addition, if a brightness coordination area is large beyond the need, since a normal display field will become narrow superfluously, as for extent which makes a brightness coordination area large, considering as the configuration which can be adjusted is more desirable than a person location field.

[0038] It corresponds to the processing which performs processing of step S03 in the brightness coordination area decision section of drawing 2.

[0039] Finally, at step S04, the video signal of a brightness coordination area is black-level-ized, and projection image information is generated. Processing which an image light projection means is the timing of the brightness coordination area signal 34 acquired at step S03, and specifically clamps to black level to the image input signal 35 which is the image information originally projected is performed, and the projection video signal 36 is acquired.

[0040] Here, although drawing 4 shows processing for a certain level 1 line, time amount maintenance is carried out one frame, and the brightness coordination area signal 34 performs black level clamp processing to the timing of the brightness coordination area signal 34 for every level Rhine of the image input signal 35, and acquires the projection video signal 36 for one frame. Since the black level field 23 is generated, the amount of direct incidence of the image light to a person's 5 eyes is reduced by the display at that time, and an anti-glare effect is acquired.

[0041] As mentioned above, although one example of anti-glare treatment was explained, the anti-glare treatment approach of this example detects the horizontal location of a person location around a display field, is the approach of carrying out black level of the image light of the level range with a display field, and has the description which can acquire an anti-glare effect certainly by simple processing compared with the case where the person location in a display field is detected strictly.

[0042] In addition, this invention is not limited to the gestalt of operation mentioned above, and various kinds of deformation is possible for it in the range of the summary of this invention.

[0043] For example, it is good only also considering the perimeter [a display field] lower field 20 of an image pick-up means as an image pick-up field.

[0044] Moreover, an image pick-up means and the processing section are another **(ed) with a projection mold display, and a personal computer may realize the processing section.

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CLAIMS

[Claim(s)]

[Claim 1] An image light projection means to project image light on a display field, and an image pick-up means to picturize said display field, A person location detection means to detect the positional information of the person located in said display field from the image pick-up information acquired by said image pick-up means, The projection mold display characterized by having an adjustment means whenever [image luminosity / which adjusts the brightness of brightness coordination area decision means to determine the brightness coordination area of said image light from a person's positional information, and said image light of said brightness coordination area].

[Claim 2] It is the projection mold display characterized by making into the brightness adjustable range of said image light the field which overlaps the person location where said person location detection means detects said brightness coordination area decision means in claim 1.

[Claim 3] It is the projection mold display characterized by said image pick-up means making said display field and boundary region the image pick-up range in claim 1.

[Claim 4] It is the projection mold display which said person location detection means detects the horizontal range of the person location in a display field in claim 3 based on the image pick-up information on the display field lower part which said image pick-up means picturized, and is characterized by for said brightness adjustable-range decision means to make said display field of the horizontal range of said person location a brightness adjustable range.

[Claim 5] It is the projection mold display characterized by an adjustment means making black level the brightness of said image light of said brightness coordination area whenever [said image luminosity] in claim 1.

[Claim 6] The information-storage medium which remembered adjustment control information to be the brightness coordination area decision control information for determining the brightness coordination area of the image light which said projection mold indicating equipment projects from the person location detection control information for detecting the positional information of the person located in said display field based on the image pick-up information on the display field of a projection mold indicating equipment, and said person's positional information whenever [f adjusting the brightness of said image light of said brightness coordination area / image luminosity] and in which computer read is possible.

[Claim 7] It is the information storage medium characterized by including the control information which makes the field which overlaps a person's location where said brightness coordination area decision control information is located in said display field in claim 6 the brightness control range of said image light.

[Claim 8] It is the information storage medium which said person location detection control information detects the horizontal range of the person location in a display field in claim 6 based on the image information of the display field lower part of a projection mold indicating equipment, and is characterized by said brightness adjustable-range decision control information including the control information which makes said display field of the horizontal range of said person location a brightness adjustable range.

[Claim 9] It is the information storage medium characterized by including the control information to which adjustment control information makes black level the brightness of said image light of said brightness coordination area whenever [said image luminosity] in claim 6.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Approximate account drawing of the activity gestalt of the projection mold display with which this invention was applied.

[Drawing 2] The functional block diagram of the projection mold indicating-equipment system of this example.

[Drawing 3] The flow chart which shows the whole anti-glare treatment of this example.

[Drawing 4] The timing chart which shows actuation of the anti-glare treatment of this example.

[Description of Notations]

1. Projector
2. CCD Camera
3. Display Field
4. Screen
5. Person
6. It is Coordination Area whenever [Image Luminosity].
7. Spectators

11. Projection Mold Display
12. Processing Section
13. Image Light Projection Means
14. Image Pick-up Means
15. Person Location Detecting Element
16. Brightness Coordination Area Decision Section
17. It is Controller whenever [Image Luminosity].
18. Image Input

20. Display Field Circumference Lower Field
22. All Image Pick-up Fields
23. Black Level Field
31. Image Pick-up Signal
32. 2 value-sized threshold level
33. Person Position Signal
34. Brightness Coordination Area Signal
35. Image Input Signal
36. Projection Video Signal

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